Elasticity of $Ca(Ti,Si)O_3$ Perovskite.	X17B1

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Elastic properties in the $CaTiO_3$ - $CaSiO_3$ system have been in the focus of this work. Polycrystalline specimens of end-member $CaTiO_3$ perovskite and intermediate $Ca(Ti_{.75}Si_{.25})O_3$, $Ca(Ti_{.5}Si_{.5})O_3$ perovskites were hot-pressed in a 2000-ton uniaxial split-sphere apparatus (USSA-2000). Intermediate compounds were synthesized at pressures of 15GPa and temperatures above 1500°C. Compressional and Shear wave velocities were measured using ultrasonic interferometry technique at room pressure and temperature. Densities of the synthesized specimens has been found by Archimedes immersion to be within 1% of the X ray density. Estimated from the acoustic measurements value of bulk moduli for intermediate $Ca(Ti_{.5}Si_{.5})O_3$ perovskite and end-member $CaTiO_3$ perovskite are 188(1) GPa and 175(1) GPa, and the shear moduli are G=109(1) GPa and 106(1) GPa, respectively. *In-situ* P-T synchrotron X ray diffraction study yielded isothermal bulk moduli of $Ca(Ti_{.5}Si_{.5})O_3$ and $CaTiO_3$, 182(5) GPa and 171(5) GPa, respectively. For unquenchable $CaSiO_3$ perovskite elasticity systematics leads the bulk modulus, K = 212(7) GPa and shear modulus, G = 112(5) GPa. Thus, predicted shear modulus of $CaSiO_3$ perovskite is 60% lower than that of $MgSiO_3$ perovskite. This implies the substantial importance of $CaSiO_3$ perovskite elastic properties in constraining the composition of the lower mantle.